

NOTES ON THE ECOLOGY OF *CYCLOCOSMIA TRUNCATA* (ARANEAE, CTENIZIDAE) IN GEORGIA

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ABSTRACT

From 23 September 1973 to 22 September 1974 nine specimens (five males, two females, two immatures) and five burrows of *Cyclocosmia truncata* were examined from the Johnson Crook area of Lookout Mountain, Dade County, Georgia. Adult males wandered from 22 August to 2 October. Male and female specimens maintained burrows with silk-leaf trapdoors but sealed the entrances during molting periods, making field detection difficult.

INTRODUCTION

All specimens of *Cyclocosmia truncata* discussed below were collected or observed in an area 12.8 x 6 m at an elevation of 400 m in the Johnson Crook area of Lookout Mountain, Dade County, Georgia. The sandy-clay soil of Johnson Crook corresponds with that described by Gertsch and Wallace (1936) for *C. truncata* habitats in Florida. From 1940 to 1970, the National Climatic Data Center, Ashville, North Carolina recorded an average annual rainfall of 135.83 cm and an average temperature of 15°C for the Johnson Crook area. Sandstone boulders are a prominent surface feature of the heavily wooded terrain. Red maple *Acer rubrum*, chestnut oak *Quercus prinus*, red bud *Cercis canadensis*, flowering dogwood *Cornus florida*, shagbark hickory *Carya ovata*, hophornbeam *Ostrya virginiana*, red cedar *Juniperus virginiana*, sassafras *Sassafras albidum*, sourwood *Oxydendrum arboreum*, and black cherry *Prunus serotina* are common. Undergrowth is sparse but bullbrier *Smilax bona-nox*, pipsissewa *Chimaphila maculata*, poison ivy *Rhus radicans*, tickseed *Coreopsis major*, and the heart leaved aster *Aster divaricatus* are present.

The following arthropods are abundant: *Trypoxylon politum* (Hymenoptera, Sphecidae), *Camponatus vespula* (Hymenoptera, Formicidae), *Photuris pennsylvanicus* (Coleoptera, Lampyridae), *Ceuthophilus stygius*, *Hadenocerus subterraneus* (Orthoptera, Gryllacrididae), *Pseudopolydesmus* sp. (Polydesmida, Polydesmidae), *Leiobunum* sp. (Opioiones, Phalangidae), *Schizocosa crassipes* (Araneae, Lycosidae), *Hypochilus thorellii* (Araneae Hypochilidae).

The burrows of *Myrmekeiaphila* (Ctenizidae) and *Antrodiaetus* (Antrodiaetidae) were also encountered in the sandy-clay soil of the *C. truncata* study area. On 8 August 1974 a brooding female *Antrodiaetus* was found. Coyle (1971) found *Antrodiaetus unicolor* associated with *C. truncata* in Alabama. A captive *Myrmekeiaphila* from the Johnson

Crook study area emerged from the burrow he constructed in captivity as a mature male on 3 November 1974.

MATERIALS AND METHODS

Searches for *Cyclocosmia truncata* were conducted at the Johnson Crook area of Lookout Mountain on 23 September 1973 and 22 April, 22 June, 21 July, 11 August, 18 August, 25 August, 1 September, 15 September, 22 September and 27 October 1974. Burrow entrances were located by brushing the leaf litter aside by hand. A large hole was dug adjacent and parallel to the spider's burrow. The *C. truncata* burrow to be excavated was collapsed into this hole. A sample of soil surrounding one burrow was soaked in Calgon® detergent and passed through a size analysis screen. The organic material in the sample was removed and then separated, desiccated mineral portion of the sample was weighed. Captive spiders were housed in insulated containers in a 21°C to 25°C basement.

RESULTS AND DISCUSSION

On 22 June 1974 at 16:45 the burrow of an immature male *C. truncata* was found under a light cover of leaf litter. The 1 m² area surrounding the burrow's entrance was on a slope of 17° from the horizontal and received direct afternoon sunlight. Silk, attached at a depth of 12 mm in the burrow, blocked entry. At a burrow depth of 40 mm the temperature was 20°C compared to an air temperature of 21°C. The nearly vertical structure of the smooth-walled burrow allowed viewing of the spider. Even during the excavation disturbance, he did not move head first to the bottom of the burrow to seal it off with his abdomen. After I removed him from the burrow the *C. truncata* feigned death for five minutes. The field burrow was 17 mm in diameter at the entrance and 63mm deep. A sample of soil surrounding this burrow contained 50% by volume organic material. The mineral portion was 54% clay-silt and 46% fine to very fine quartz sand by weight.

A small amount of leaf litter and the sandy-clay soil around the burrow was placed in a 3.7 liter plastic cooler to a depth of 152 mm. Light entered the cooler through a transparent lid. Within four days the captive *C. truncata* completed a burrow in the insulated cooler. The lower half of the burrow and the larger, bulbous upper half were lined with silk which was continuous with the hinge on a silk and leaf trap door at the soil's surface. Small cave crickets *Ceuthophilus stygillus* were kept with this specimen. When disturbed near the entrance, the *C. truncata* turned and ran head first to the bottom of the burrow. On 7 July 1974 the captive specimen sealed the entrance of his burrow with silk. He repaired small tears in the seal until 22 August 1974 when he emerged from the burrow (Fig. 1) as a mature male with a reduced, 6 mm wide abdomen.

After a heavy rain, on 11 August 1974 at 20:00 another *C. truncata* was found in the study area. The 1 m² area surrounding the burrow's entrance was on a slope of 17° from the horizontal. No trapdoor was seen covering the entrance. When discovered, the spider turned and ran head-first to the bottom of the nearly vertical 152 mm burrow. By 18 August 1974 the *Cyclocosmia truncata* had sealed the burrow's entrance with silk. The seal was attached at a point 6 mm down in the burrow. Partial excavation of this burrow exposed a recently molted female facing out. This specimen and her burrow could not be found one week later.

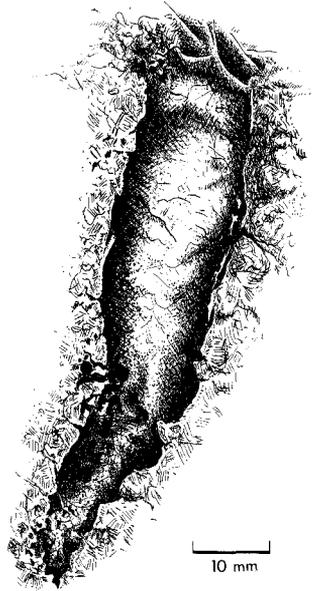


Fig. 1.—Burrow of captive male *Cyclocosmia truncata*.

Three *C. truncata* burrows were found on 25 August 1974 in the Johnson Crook study area. The air temperature at 11:30 was 29°C while the average burrow temperature at a depth of 40 mm was 26°C. No trap doors were seen. Even when the leaf cover over the burrows was removed by hand, the delicate trapdoors were brushed away and destroyed. One *C. truncata* burrow with an entrance diameter of 8 mm was north and down slope 42 cm from the base of a 35 cm diameter *Quercus prinus*. The 1 m² area surrounding the entrance was on a slope of 23°. The two other burrows were 43 cm apart on a slope of 19° from the horizontal and were northeast and down slope 68 cm from the base of a 50 cm diameter *Q. prinus*. A heavy layer of dead leaves covered the ground for a distance of 1 m up slope from the bases of the two large trees but the 1 m area down slope was only covered lightly by leaf litter. Two burrows containing *C. truncata* were marked for future field observations but one week later no trace of them was found.

The larger of the two 19° burrows was excavated and the living female *C. truncata* collected for captive observations. The field burrow was 15 mm in diameter at the entrance and 73 mm deep. At a depth of 57 mm the spider's truncated abdomen was wedged tightly into a burrow diameter of 7 mm. The wall of this silk-lined burrow was 1.5 mm thick at the entrance. Soil at the site was placed in a 22.7 liter plastic insulated cooler to a depth of 330 mm. Light entered the cooler through a transparent top. On her first night in this container she built a burrow and attached a silk-leaf trapdoor which she held closed if disturbed at the entrance. On 1 September the captive male *C. truncata* was introduced to this female. On 6 September 1974 he was found dead with the first pair of legs missing at the coxae. The female *C. truncata* sealed the entrance to her burrow on 7 September 1974 by attaching a silk plug at a point 7 mm below the entrance to the burrow. On 9 September 1974 and 11 October 1974 a legless field cricket *Acheta domestica* was left over the seal. On each occasion the female ate the cricket at night and resealed the burrow. She left the undigested part of a cricket outside the entrance to her

burrow on 12 October 1974.

Four male *C. truncata* were found at the bottom of a 6.4 m pit in the study area. On 23 September 1973 a dead male was found in this natural trap. Two dead and one live male were discovered on 15 September 1974. One of the two dead specimens was badly decomposed and disintegrated when it was touched.

The live specimen was taken from the pit and released into an unoccupied *Cyclocosmia truncata* burrow in the study area. On 22 September 1974 I found this male in the same burrow with his abdomen toward the entrance. His abdomen did not seal the bottom of the burrow and he turned to face my intrusion with his fangs. Excavation was not necessary because he left the burrow when disturbed. The author isolated him in a 3.7 liter container where he died on 2 October 1974 with his first leg separated at the coxa. This male *C. truncata* was deposited in the American Museum of Natural History.

Perhaps the alleged rarity of *Cyclocosmia truncata* is a result of its microenvironmental requirements and secretive nature. A light cover of leaf litter to keep the straw colored, sandy-clay soil slightly moist and a 17°-23° slope are indicators for the discovery of burrows at the Johnson Crook study area. Locating a field burrow is very difficult when *C. truncata* seals the entrance. Captive specimens maintained under natural conditions can provide additional information on the habits of this cryptic spider.

ACKNOWLEDGMENTS

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